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Efficacy of Psychotherapies for Borderline Personality Disorder
A Systematic Review and Meta-analysis

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IMPORTANCE Borderline personality disorder (BPD) is a debilitating condition, but several psychotherapies are considered effective.

OBJECTIVE To conduct an updated systematic review and meta-analysis of randomized clinical trials to assess the efficacy of psychotherapies for BPD populations.

DATA SOURCES Search terms were combined for *borderline personality* and *randomized trials* in PubMed, PsycINFO, EMBASE, and the Cochrane Central Register of Controlled Trials (from database inception to November 2015), as well as the reference lists of earlier meta-analyses.

STUDY SELECTION Included were randomized clinical trials of adults with diagnosed BPD randomized to psychotherapy exclusively or to a control intervention. Study selection differentiated stand-alone designs (in which an independent psychotherapy was compared with control interventions) from add-on designs (in which an experimental intervention added to usual treatment was compared with usual treatment alone).

DATA EXTRACTION AND SYNTHESIS Data extraction coded characteristics of trials, participants, and interventions and assessed risk of bias using 4 domains of the Cochrane Collaboration Risk of Bias tool (independent extraction by 2 assessors). Outcomes were pooled using a random-effects model. Subgroup and meta-regression analyses were conducted.

MAIN OUTCOMES AND MEASURES Standardized mean differences (Hedges *g*) were calculated using all outcomes reported in the trials for borderline symptoms, self-harm, suicide, health service use, and general psychopathology at posttest and follow-up. Differential treatment retention at posttest was analyzed, reporting odds ratios.

RESULTS Thirty-three trials (2256 participants) were included. For borderline-relevant outcomes combined (symptoms, self-harm, and suicide) at posttest, the investigated psychotherapies were moderately more effective than control interventions in stand-alone designs (g = 0.32; 95% CI, 0.14-0.51) and add-on designs (g = 0.40; 95% CI, 0.15-0.65). Results were similar for other outcomes, including stand-alone designs: self-harm (g = 0.32; 95% CI, 0.09-0.54), suicide (g = 0.44; 95% CI, 0.15-0.74), health service use (g = 0.40; 95% CI, 0.22-0.58), and general psychopathology (g = 0.32; 95% CI, 0.09-0.55), with no differences between design types. There were no significant differences in the odds ratios for treatment retention (1.32; 95% CI, 0.87-2.00 for stand-alone designs and 1.01; 95% CI, 0.55-1.87 for add-on designs). Thirteen trials reported borderline-relevant outcomes at follow-up (g = 0.45; 95% CI, 0.15-0.75). Dialectical behavior therapy (g = 0.34; 95% CI, 0.15-0.53) and psychodynamic approaches (g = 0.41; 95% CI, 0.12-0.69) were the only types of psychotherapies more effective than control interventions. Risk of bias was a significant moderator in subgroup and meta-regression analyses (slope β = −0.16; 95% CI, −0.29 to −0.03; P = .02). Publication bias was persistent, particularly for follow-up.

CONCLUSIONS AND RELEVANCE Psychotherapies, most notably dialectical behavior therapy and psychodynamic approaches, are effective for borderline symptoms and related problems. Nonetheless, effects are small, inflated by risk of bias and publication bias, and particularly unstable at follow-up.

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Editorial
Supplemental content

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Borderline personality disorder (BPD) is a debilitating mental disorder characterized by severe instability in affect, identity, interpersonal relationships, and behavioral dysregulation.[1] Alongside a vast array of comorbidities, parasuicide (ie, nonlethal intentional self-harming behaviors) and suicide are commonly associated problems. More than 75% of patients with BPD are believed to engage in deliberate self-harm.[2] Suicide rates are estimated to be between 8% and 10%,[3,4] almost 50 times higher than in the general population.[5] Borderline personality disorder is the most common personality disorder in clinical populations,[5,6] associated with intensive use of mental health services[7,8] even in the absence of a full diagnosis.[9] Functional impairment is considerable compared with other personality disorders[10] and is enduring in the absence of a change in personality psychopathology.[11]

Several psychotherapy approaches were specifically developed for the disorder, most notably dialectical behavior therapy (DBT),[12] cognitive behavior therapy (CBT),[13] and psychodynamic treatments, such as mentalization-based therapy[14] or transference-focused psychotherapy.[15] Each approach appeared to be more effective than treatment as usual (TAU) for BPD-related problems, such as suicidality or parasuicidal behavior.[16-19] Trials of direct comparisons of treatments for BPD reported few differences among them.[20,21] However, most trials demonstrating effectiveness were conducted with the direct participation of the treatment developer. Previous meta-analyses of psychotherapeutic treatments for BPD have been scarce and used focused criteria for assessing effectiveness, avoiding combining treatments. One meta-analysis[22] of DBT for BPD reported moderate effects for borderline-relevant outcomes, suicidality, and self-harm. However, analysis restricted to randomized clinical trials (RCTs) showed reduced effects, with nonsignificance for suicidality and self-harm. Another meta-analysis[23] of RCTs for BPD reported only moderate effects for the comparison between DBT and TAU.

Conversely, because effectiveness differences between therapies appear to be limited and because variations of the same intervention are to be expected in diverse implementation settings, we believe that a broader effectiveness evaluation grouping therapies into theoretically intelligible categories is germane. Heterogeneity, publication bias, and potential moderators of efficacy (eg, treatment duration and type of psychotherapy) are additional unclear issues. Moreover, because the study collection dates of the 2 previous meta-analyses[22,23] preceded 2012, new trials or follow-ups of older trials published since then should be considered. Therefore, our objective was to conduct an updated systematic review and meta-analysis of RCTs to assess the efficacy of psychotherapies for BPD-relevant outcomes at posttest and, where possible, at follow-up.

Key Points

Question What is the efficacy of psychotherapy for borderline personality disorder?

Findings In this systematic review and meta-analysis of randomized clinical trials, outcomes of psychotherapies (most notably dialectical behavior therapy and psychodynamic approaches) significantly improved borderline-relevant outcomes (symptoms, self-harm, and suicide) compared with control interventions. However, differences dissipated in well-designed and implemented trials or if the control group was balanced for manualization of treatment or the involvement of the study team in treatment.

Meaning Psychotherapies specifically designed for borderline personality disorder have significant yet modest benefits over treatment as usual, and future independent and well-conducted trials are needed to clarify the stability and practical relevance of their effects.

Methods

Identification and Selection of Studies

Studies were identified through searches in 4 bibliographical databases (from database inception to November 2015 in PubMed, PsycINFO, EMBASE, and the Cochrane Central Register of Controlled Trials) using the search term *borderline personality* (both text word and Medical Subject Headings term), with a filter for *randomized trials* (eMethods in the Supplement). We also checked the reference lists of earlier meta-analyses.[22,23]

Studies were included if they were RCTs in which a psychotherapy was compared with a control condition for adults diagnosed as having BPD. Given the diversity and complexity of therapy orientations, we used an inclusive approach in delineating the psychotherapy and control conditions. We used a customary definition of *psychotherapy* emphasizing verbal communication, structured and purposeful therapist-patient encounters, and the establishment of a therapeutic relationship.[24,25] No constraints were placed on the control group, which could include (but was not restricted to) TAU or other treatments not specifically developed for BPD. Comparisons between 2 different psychotherapies specifically developed for BPD (ie, DBT and transference-focused psychotherapy) or between forms of the same psychotherapy (eg, DBT vs its skills training component) were excluded because of expectations of similar efficacy. Concomitant medication use was not an exclusion criterion unless it was prescribed in a standardized way, as in trials in which individuals were randomized to a combination of psychotherapy and either pharmacotherapy or placebo. Medication use followed a systematic protocol, and we could not disentangle its effects from those of psychotherapy. Studies on even partially adolescent samples were excluded because BPD diagnosis and treatment pose distinct challenges for this group. No language restrictions were applied. One researcher (I.A.C.) screened all records, and full texts were obtained for RCTs. Two independent assessors (I.A.C. and C.D.C.) examined the full texts and selected eligible RCTs.

Risk of Bias and Data Extraction

Trial risk of bias (RoB) was evaluated within 4 domains of the Cochrane Collaboration Risk of Bias tool,[26] which assesses sources of bias in RCTs. Rated domains included (1) adequate

generation of allocation sequence, (2) concealment of allocation to conditions, (3) prevention of knowledge of the allocated intervention to assessors of outcome (masking of assessors), and (4) dealing with incomplete data. This last domain was assessed as low risk if proper intent-to-treat (ITT) analyses were conducted, meaning that authors used a method for imputing missing values so that all randomized participants were included in the analyses. Masking of assessors was rated as low risk if the trial described proper methods of ensuring masking or if all relevant outcome measures were self-report instruments, thus not requiring the direct interaction with an assessor. For use in meta-regression analyses, we computed an overall RoB score for each study by awarding 1 point for each bias source rated as low risk.

Among trials, we distinguished between stand-alone designs (in which the experimental group received a full course of an independent BPD psychotherapy and the control group received TAU or another therapy not specific for BPD) and add-on designs (in which both groups received TAU and the experimental group received an additional BPD therapy). We also extracted characteristics of the participants, interventions, and studies, including therapy type (DBT, psychodynamic, CBT, or other); control group (TAU, supportive therapy, or an ad hoc control, designed as part of the trial); whether the control group was manualized (ie, followed a treatment protocol or manual); involvement or noninvolvement of the study team in treating the control group; the presence or absence of a treatment developer as an author of the trial report; therapist supervision for the experimental group (by the treatment developer or by others); and low RoB (studies rated as low risk for ≤2 vs ≥3 RoB domains). We also extracted the following treatment intensity variables: treatment duration (in months), treatment exposure (in hours, calculated by multiplying the session duration for individual or group therapy by the number of sessions either planned or, if available, attended on average for the experimental and control groups), and difference in treatment exposure between the intervention and control groups (in hours). Risk of bias assessment and data extraction were performed by 2 independent assessors. Interrater agreement κ statistics were computed (eMethods in the Supplement), and disagreement was resolved by discussion among assessors and with the senior author (P.C.).

Meta-analysis

To capture the breadth and variability of reported outcomes, we grouped them into the following categories: borderline relevant (BPD symptom measures, self-harm and parasuicide, and suicidal behaviors), borderline symptoms (only BPD symptom measures), self-harm and parasuicidal behavior, suicidal behavior, health service use (hospitalizations [whether psychiatric or general], use of emergency services, use of additional outpatient services, and medication use), and general psychopathology (general psychopathology, anxiety, or depression). Treatment retention was computed as the comparative dropout rates between the intervention and control groups. *Dropouts* (eMethods in the Supplement) were defined as all randomized participants not finishing treatment, regardless of the reasons. *Adverse effects* were defined as participant death by suicide and as death from any cause after randomization.

The between-group effect size was calculated as the difference between the intervention and control groups at posttest and at follow-up (Hedges *g*), corrected for small sample sizes.[27] Follow-up data more than 2 years from treatment termination or in which the control group also received the experimental treatment were not included. Data across multiple follow-up points were averaged at the study level for each outcome category. For treatment retention, odds ratios indicated the odds of maintaining participants in treatment in the intervention group vs the control group.

If a trial reported data on multiple outcomes in the same category, the mean effect size was calculated using the procedures by Borenstein et al[28] so that each trial reported just one effect size in a category at each time point. Where available, the means (SDs) were used, but if only dichotomous outcomes were reported, we used available procedures[28] to compute the standardized mean difference. If a study did not include sufficient data for effect size calculation, the authors were contacted, and the study was excluded if they failed to provide data. Where available, ITT data were preferred. Effect sizes for dichotomous outcomes were computed, adhering to the ITT principle, by reporting the observed or imputed number of patients with an event (eg, self-harm) relative to the total number of patients randomized to that group.

We used a software program (Comprehensive Meta-Analysis, version 3; Biostat) for computing and pooling effect sizes, with a random-effects model for pooling effect sizes. We calculated the number needed to treat using the formulas by Kraemer and Kupfer.[29] Heterogeneity was assessed with the I^2 statistic: 0% indicates no observed heterogeneity, and higher values indicate increasing heterogeneity, with 25%, 50%, and 75% defining thresholds for low, moderate, and high. We calculated 95% CIs around I^2 statistics[30] using a noncentral χ^2-based approach (heterogi module for Stata, version 8; StataCorp LP).[31] *Outliers* were defined as studies in which the 95% CI was outside the 95% CI of the pooled studies (on both sides). For categorical moderators, we conducted subgroup analyses using a mixed-effects model.[28] For continuous moderators, meta-regression analyses used a restricted maximum likelihood model with the Knapp-Hartung method.[28] We examined publication bias through visual funnel plot inspection, the trim-and-fill procedure[32] (which produces an effect size estimate after accounting for publication bias), and Egger test for funnel plot asymmetry.

Results

Selection and Inclusion of Studies

We screened 1058 abstracts, removed 500 duplicates, and subsequently retrieved 158 full-text articles. Thirty-eight trials examined a psychotherapy, with 5 excluded for comparing 2 versions of the same therapy. Consequently, 33 trials (2256 participants) met our inclusion criteria, and 28 of them had enough data for calculating effect sizes (eFigure 1 in the Supple-

Table 1. Main Effects at Posttest and Follow-up of Trials Comparing Experimental Psychotherapy and Control Treatments for Borderline Personality Disorder

Variable	Stand-alone Design				Add-on Design				P Value[b]
	No. of Trials	Hedges g (95% CI)[a]	NNT	I^2 (95% CI), %	No. of Trials	Hedges g (95% CI)[a]	NNT	I^2 (95% CI), %	
Posttest									
Borderline-relevant outcomes[c]	17	0.32 (0.14 to 0.51)	5.56	49 (0 to 69)	10	0.40 (0.15 to 0.65)	4.50	50 (0 to 74)	.63
Borderline symptoms	10	0.31 (0.04 to 0.57)	5.75	62 (3 to 79)	8	0.56 (0.15 to 0.97)	3.25	76 (43 to 87)	.30
Self-harm and parasuicidal behavior	13	0.32 (0.09 to 0.54)	5.56	55 (0 to 75)	6	0.24 (−0.07 to 0.55)	7.46	41 (0 to 75)	.68
Suicide	10	0.44 (0.15 to 0.74)	4.10	60 (0 to 78)	3	0.35 (0.02 to 0.68)	5.10	10 (0 to 75)	.67
Health service use	13	0.40 (0.22 to 0.58)	4.50	22 (0 to 59)	3	0.16 (−0.13 to 0.46)	11.11	5 (0 to 74)	.17
General psychopathology, anxiety, and depression	13	0.32 (0.09 to 0.55)	5.56	62 (18 to 78)	10	0.53 (0.24 to 0.82)	3.42	62 (4 to 79)	.25
Follow-up									
Borderline-relevant outcomes[c]	7	0.56 (0.17 to 0.95)	3.25	62 (0 to 81)	6	0.35 (−0.15 to 0.85)	5.10	79 (41 to 89)	.51
Borderline symptoms	3	0.34 (−0.13 to 0.81)	5.26	64 (0 to 88)	4	0.43 (−0.41 to 1.26)	4.20	87 (62 to 93)	.85
Self-harm and parasuicidal behavior	5	0.58 (0.06 to 1.10)	3.14	74 (0 to 88)	4	0.04 (−0.21 to 0.30)	45.45	0 (0 to 68)	.07
Suicide	5	0.34 (−0.06 to 0.74)	5.26	39 (0 to 76)	2	0.31 (−0.04 to 0.66)	5.75	0	.90
Health service use	4	0.30 (−0.10 to 0.70)	5.95	51 (0 to 82)	2	0.06 (−0.32 to 0.44)	29.41	0	.39
General psychopathology, anxiety, and depression	5	−0.15 (−1.12 to 0.83)	11.90	93 (88 to 96)	5	0.40 (−0.11 to 0.91)	4.50	78 (27 to 89)	.33

Abbreviation: NNT, number needed to treat.

[a] According to the random-effects model. A positive effect indicates superiority of the experimental psychotherapy over control treatments.

[b] The *P* values indicate whether the difference between the effect sizes in the group of trials with stand-alone vs add-on designs is significant.

[c] Borderline-relevant outcomes include borderline symptoms, self-harm and parasuicidal behavior, and suicide.

ment). For the 5 missing trials,[20,33-36] the authors were contacted, but they did not provide the requested data.

Characteristics of Included Studies

The 33 trials included 1169 participants in the investigated treatment group and 1087 participants in the control group (eTable 1 in the Supplement). Seventeen trials targeted patients with BPD diagnosed using a structured clinical interview, 10 trials targeted patients with BPD with recent documented self-harm, and the rest targeted special BPD populations (eg, veterans and individuals with addiction). Twenty-two trials had a stand-alone design, and 11 trials had an add-on design. Twelve trials had women-only samples, and this percentage ranged from 0% to 95% in the remainder. The best-represented approaches were DBT (12 trials), psychodynamic therapies (8 trials), and CBT (5 trials). Twenty-one trials had TAU as the control treatment, and the control treatment was manualized in 10 trials. The treatment developer was an author in 20 trials. In 15 trials, the treatment developer was a therapist or supervised therapists directly. Treatment duration ranged from 2.5 to 24 months, and the number of sessions (for individual and group therapy taken together) ranged from 6 to 312.

The κ statistics indicated high interrater agreement for RoB estimations (eMethods in the Supplement), which were variable (eFigure 2 in the Supplement). Sixteen trials reported adequate sequence generation, 12 trials properly concealed allocation, and 20 trials implemented masking of outcome assessors (2 used self-report measures only). However, for incomplete outcome data, only 13 trials were rated as low RoB, and more than half had high RoB. Eleven trials could be rated as low risk on 3 or 4 domains.

Main Effects at Posttest

Stand-alone Designs

Results showed significant effects for all outcome categories, ranging from 0.31 (0.04-0.57) for borderline symptoms to 0.44 (0.15-0.74) for suicide outcomes (**Table 1**). Heterogeneity was moderate to high with the exception of health service use. For all borderline-relevant outcomes (eFigure 3 in the Supplement), 17 trials had a Hedges *g* of 0.32 (95% CI, 0.14-0.51), with moderate heterogeneity (48%).

Add-on Designs

For borderline-relevant outcomes (Table 1 and eFigure 3 in the Supplement), 10 trials had a Hedges *g* of 0.40 (95% CI, 0.15-0.65), with moderate heterogeneity (50%). Results were not significant for self-harm and parasuicidal behavior or for health service use, but the number of trials was small (range, 3-6).

All Trials

Combining both design types for all borderline-relevant outcomes (combining borderline symptoms, self-harm and para-

suicidal behavior, and suicide) yielded a significant effect (g = 0.35; 95% CI, 0.20-0.50 [27 trials]), with moderate heterogeneity (48%) (**Table 2** and **Figure**). Results with outliers excluded or excluding comparisons with supportive therapy were similar.

For treatment retention, results were not significant for stand-alone designs (odds ratio, 1.32; 95% CI, 0.87-2.00 [15 trials]) or add-on designs (odds ratio, 1.01; 95% CI, 0.55-1.87 [10 trials]), and heterogeneity was moderate to high (59% for stand-alone designs and 44% for add-on designs). There were no significant differences between the 2 design types on any of the symptom outcome categories or on treatment retention.

Main Effects at Follow-up

Adverse Effects

There were 2 deaths by suicide in the treatment group and 5 deaths by suicide in the control group. The treatment group and the control group each had 6 all-cause deaths.

Stand-alone Designs

Seven trials had a significant effect of 0.56 (95% CI, 0.17-0.95) for all borderline-relevant outcomes (Table 1). Heterogeneity was high (62%). The number of trials was too small (range, 3-5) for the other outcome categories.

Add-on Designs

Six trials had a nonsignificant effect (g = 0.35; 95% CI, −0.15 to 0.85) for all borderline-relevant outcomes (Table 1). Heterogeneity was high (79%). There were too few trials (range, 2-5) in the other outcome categories.

All Trials

Combining both design types yielded a significant effect (g = 0.45; 95% CI, 0.15-0.75 [13 trials]), with high heterogeneity (70%). These results are summarized in Table 2 and in eFigure 4 in the Supplement.

Subgroup and Meta-regression Analyses

Subgroup Analyses

These analyses were conducted on the most inclusive outcome category (all borderline-relevant outcomes), combining stand-alone and add-on designs because we found no differences among them (Table 2 and eTable 2 in the Supplement). The DBT (g=0.34; 95% CI, 0.15-0.53 [9 trials]) and psychodynamic approaches (g=0.41; 95% CI, 0.12-0.69 [7 trials]) were more effective than control interventions, while CBT (g = 0.24; 95% CI, −0.01 to 0.49 [5 trials]) and other interventions (g = 0.38; 95% CI, −0.15 to 0.92 [6 trials]) were not.

Trials with an ad hoc control group developed as part of the study, trials in which the control intervention was manualized, or trials in which the study team was involved in treating the control group, as well trials with low RoB for 3 or 4 domains, generated nonsignificant between-group effects. Psychotherapies were more effective than control interventions in trials with more RoB than in those with less RoB (0.48 vs 0.11, P = .01).

Meta-regression Analyses

Risk of bias (the number of criteria with low RoB) had a significant negative association with outcomes at posttest (slope β = −0.16; 95% CI, −0.29 to −0.03; P = .02) (eFigure 5 in the Supplement). Dropout rates in the treatment group, treatment duration, treatment exposure in the treatment group or the control group, and difference in treatment exposure between groups were not significantly related to outcomes.

Publication Bias

Inspection of the funnel plot and the trim-and-fill procedure documented publication bias for borderline-relevant outcomes (eFigure 6 in the Supplement). At posttest, considering all trials, adjustment for missing studies (n = 6) decreased the effect size from a Hedges g of 0.35 (95% CI, 0.20-0.50) to 0.23 (95% CI, 0.07-0.38). For stand-alone designs, 4 studies were imputed, leading to a smaller but significant Hedges g of 0.20 (95% CI, 0.01-0.39). For add-on designs, 2 studies were imputed, resulting in a Hedges g of 0.30 (95% CI, 0.05-0.56). Egger test was not significant in any of these cases. At follow-up, considering all trials, adjustment for missing studies (n = 3) led to a nonsignificant Hedges g of 0.19 (95% CI, −0.15 to 0.53), and Egger test was significant (intercept β = 2.78; 95% CI, 0.18-5.39; P = .04).

Discussion

We conducted an updated systematic review and meta-analysis of RCTs of psychotherapies for BPD. We included 33 trials, either stand-alone designs (an independent experimental treatment vs TAU or another control) or add-on designs (an experimental treatment superimposed to TAU vs TAU alone). We examined disorder-specific outcomes (BPD symptoms, self-harm and parasuicide, and suicide) and more general outcomes, such as psychopathology or health service use. Most trials (22 of 33) had stand-alone designs, and our results showed significant, small, posttest between-group effect sizes, with high to moderate heterogeneity across all outcome categories. Results were more variable for add-on designs, including nonsignificant effects. Nonetheless, the number of trials for some outcome categories was small, and these findings should be viewed as tentative and possibly spurious. However, for borderline-relevant outcomes and psychopathology (for which most add-on trials included measures), effects were small to medium. We operated with this design distinction so as not to confound more intensive psychotherapeutic treatments with others designed to complement usual treatment, although subsequent subgroup analysis found no difference between the 2 design types on any of the outcome categories. We also found no differences between types of psychotherapies. Most trials focused on DBT followed by psychodynamic approaches, and both types generated significant, small between-group effect sizes, with low heterogeneity for DBT. Surprisingly, CBT was not superior to control conditions. Although this result was based on only 5 trials, heterogeneity was low.

Table 2. Main Effects and Results of Subgroup and Meta-regression Analyses at Posttest and Follow-up of Trials, Combining Both Design Types, for Borderline-Relevant Outcomes

Variable	No. of Trials	Hedges *g* (95% CI)[a]	I^2 (95% CI), %	NNT	*P* Value[b]
Posttest					
Borderline-relevant outcomes[c]	27	0.35 (0.20 to 0.50)	48 (9 to 66)	5.10	NA
Outliers excluded	26	0.38 (0.25 to 0.51)	33 (0 to 57)	4.72	NA
Comparisons with supportive therapy excluded	24	0.35 (0.19 to 0.50)	48 (5 to 67)	5.10	NA
Outcomes measured on scales created by the treatment developer	15	0.26 (0.10 to 0.41)	27 (0 to 60)	6.85	NA
Studies conducted by and outcomes measured on scales created by the treatment developer	9	0.36 (0.12 to 0.60)	44 (0 to 72)	5.00	NA
Subgroup analysis[d]					
Dialectical behavior therapy	9	0.34 (0.15 to 0.53)	19 (0 to 62)	5.26	.87
Psychodynamic approaches	7	0.41 (0.12 to 0.69)	42 (0 to 74)	4.39	
Cognitive behavior therapy	5	0.24 (−0.01 to 0.49)	15 (0 to 69)	7.46	
Other interventions	6	0.38 (−0.15 to 0.92)	79 (41 to 89)	4.72	
Control group					
Treatment as usual	18	0.40 (0.25 to 0.56)	22 (0 to 57)	4.50	.49
Supportive therapy	3	0.37 (−0.36 to 1.09)	62 (0 to 87)	4.85	
Ad hoc control group	6	0.17 (−0.17 to 0.52)	73 (13 to 86)	10.42	
Control group manualized					
No	19	0.39 (0.25 to 0.53)	17 (0 to 52)	4.59	.27
Yes	7	0.16 (−0.22 to 0.55)	73 (26 to 86)	11.11	
Study team treating the control group					
No	17	0.42 (0.28 to 0.56)	6 (0 to 48)	4.27	.14
Yes	10	0.18 (−0.11 to 0.46)	67 (21 to 81)	9.80	
Treatment developer a trial author					
No	12	0.31 (0.16 to 0.46)	5 (0 to 52)	5.75	.79
Yes	15	0.35 (0.10 to 0.59)	63 (26 to 78)	5.10	
Therapist supervision					
Treatment developer	11	0.37 (0.13 to 0.62)	52 (0 to 74)	4.85	.49
Other	8	0.26 (0.08 to 0.45)	9 (0 to 60)	6.85	
Low risk of bias criteria					
0-2	18	0.48 (0.33 to 0.64)	15 (0 to 52)	3.76	.01
3-4	9	0.11 (−0.12 to 0.35)	57 (0 to 78)	16.13	
Follow-up					
Borderline-relevant outcomes[c]	13	0.45 (0.15 to 0.75)	70 (41 to 82)	4.00	NA
Outliers excluded	12	0.32 (0.08 to 0.55)	52 (0 to 73)	5.56	NA
Comparisons with supportive therapy excluded	12	0.47 (0.16 to 0.78)	73 (45 to 83)	3.85	NA
Subgroup analysis[d]					
Dialectical behavior therapy	4	0.42 (−0.02 to 0.87)	62 (0 to 85)	4.27	.18
Psychodynamic approaches	2	0.40 (−1.10 to 1.89)	88 (Not available)[e]	4.50	
Cognitive behavior therapy	5	0.12 (−0.12 to 0.35)	0 (0 to 64)	14.71	
Other interventions	2	1.53 (0.11 to 2.99)	84 (Not available)[e]	1.39	
Control group					
Treatment as usual	9	0.52 (0.10 to 0.94)	76 (48 to 86)	3.50	.63
Ad hoc control group	3	0.36 (−0.11 to 0.84)	66 (0 to 88)	5.00	

(continued)

Table 2. Main Effects and Results of Subgroup and Meta-regression Analyses at Posttest and Follow-up of Trials, Combining Both Design Types, for Borderline-Relevant Outcomes (continued)

Variable	No. of Trials	Hedges *g* (95% CI)[a]	I^2 (95% CI), %	NNT	*P* Value[b]
Control group manualized					
No	10	0.50 (0.13 to 0.87)	73 (42 to 84)	3.62	.61
Yes	3	0.31 (−0.31 to 0.93)	64 (0 to 88)	5.75	
Study team treating the control group					
No	8	0.63 (0.19 to 1.07)	76 (43 to 87)	2.91	.15
Yes	5	0.20 (−0.19 to 0.58)	52 (0 to 81)	8.93	
Treatment developer a trial author					
No	4	0.14 (−0.09 to 0.37)	0 (0 to 68)	12.82	.09
Yes	9	0.57 (0.12 to 1.02)	77 (51 to 87)	3.18	
Therapist supervision					
Treatment developer	7	0.32 (−0.07 to 0.73)	63 (0 to 82)	5.56	.49
Other	4	0.62 (−0.11 to 1.36)	85 (54 to 93)	2.96	
Low risk of bias criteria					
0-2	9	0.56 (0.13 to 0.99)	75 (45 to 86)	3.25	.24
3-4	4	0.23 (−0.12 to 0.57)	46 (0 to 81)	7.69	

Abbreviations: NNT, number needed to treat; NA, not applicable.

[a] According to the random-effects model.

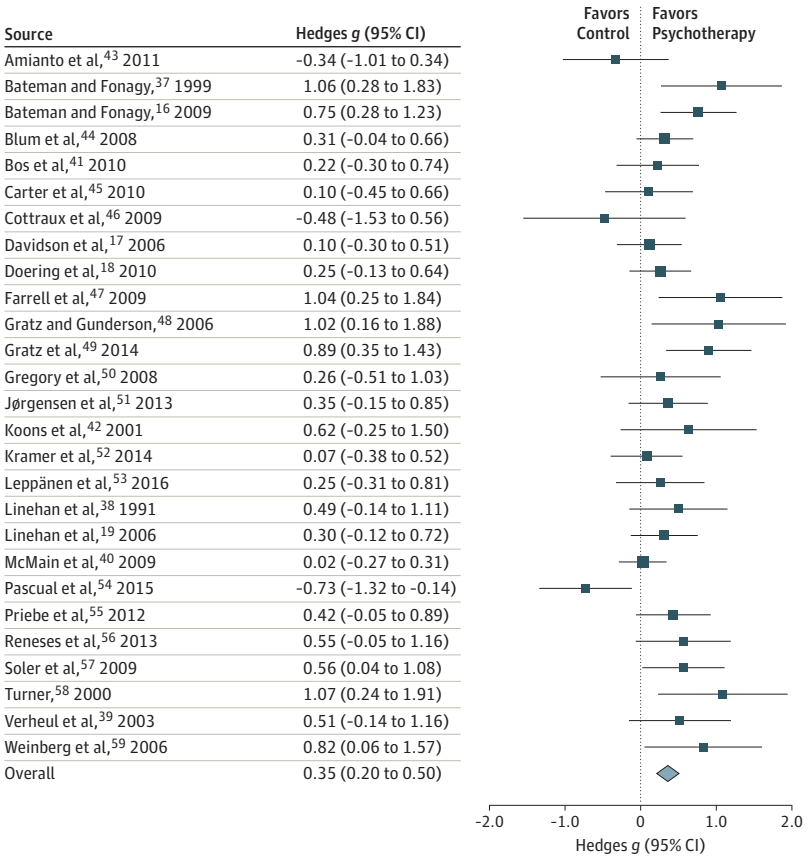
[b] The *P* values indicate whether the difference between the effect sizes in the subgroups is significant.

[c] Borderline-relevant outcomes include borderline symptoms, self-harm and parasuicidal behavior, and suicide.

[d] Subgroup analyses were conducted using a mixed-effects model. Only subgroups with at least 2 trials were included.

[e] The 95% CIs around I^2 cannot be calculated if there are fewer than 3 subgroups.

Figure. Borderline-Relevant Outcomes



Shown are standardized posttest effect sizes of comparisons between investigated psychotherapies and control conditions for borderline-relevant outcomes (borderline symptoms, self-harm and parasuicidal behavior, and suicide) for 27 trials.[16-19,37-59]

Follow-up results for all borderline-relevant outcomes showed significant medium effects for stand-alone designs and nonsignificant results for add-on designs. Heterogeneity was high, reflecting substantial differences in follow-up duration and type among trials, with some being naturalistic and others including booster interventions, which in some cases were intensive.[37] We did not include follow-up points more than 2 years after treatment termination because a longer time span

increases the risk of biasing effects from factors extraneous to the intervention. Adverse effects were rare in both the experimental and control treatment groups.

A surprising finding regarded treatment retention, for which we found no significant differences between the experimental treatment and control groups. This result remained stable for both design types and showed moderate heterogeneity. Improving treatment retention has generally been seen as a substantial advantage of psychotherapies for BPD, and most trials in general have demonstrated very favorable evaluations. This discrepancy might stem from the fact that individual trials used variable ways of calculating dropout rates, while we used a standard ITT method whereby all participants who did not finish treatment after randomization were considered dropouts regardless of whether they started treatment or what their specific reasons were for discontinuing it. Moreover, in calculating rates, we reported the absolute number of dropouts relative to the number of randomized participants in each group. In contrast, individual trials used very diverse methods for defining dropouts, such as considering participants who switched therapists[19,38,39] or who missed 4 consecutive sessions.[40] In other cases, participants who did not initiate treatment were not counted when calculating dropout rates.[39,41,42] One meta-analysis[60] of treatment completion in BPD reported high treatment completion rates (approximately 75%) but with substantial between-study heterogeneity. However, included studies were both observational and controlled trials, randomized or not. Unlike herein, the authors did not calculate differences in treatment completion between the experimental and control groups. Instead, they pooled absolute rates for the former, a procedure that is discouraged because it can lead to extremely high levels of heterogeneity.[61]

We further investigated the potential sources of heterogeneity in subgroup and meta-regression analyses. More than half of the trials included the treatment developer as an author, but they generated similar effects as independent trials. Yet a subtler effect potentially related to the involvement of the treatment developer emerged: differences between the experimental treatment and control groups were no longer significant in trials with an ad hoc control group developed as part of the study, where the control intervention was manualized, or where the study team was involved in treating the control group. We can speculate that, at least in part, the differential efficacy of psychotherapies designed for BPD in contrast to usual treatment could be due to the "special attention" granted to the experimental group or indeed to having a manualized, structured treatment. Nevertheless, treatment intensity (both treatment duration and exposure) was not related to the treatment outcomes considered.

Trial RoB consistently emerged as a moderator of effect sizes in both subgroup and meta-regression analyses. Trials with low RoB for at least 3 of the 4 domains considered generated nonsignificant effects for borderline-relevant outcomes. Moreover, there was a linear relationship between the number of criteria with low RoB and effect sizes: effects decreased by 0.16 for each additional domain that could be rated as low RoB. There was also evidence of publication bias for posttest results and particularly for follow-up. Its potential adjustment reduced effect sizes to smaller, albeit significant, values for both design types at posttest but to nonsignificant values for both design types at follow-up.

Limitations

Our meta-analysis has several limitations. Some outcome categories or subgroups included data from a small number of trials, rendering resultant effect sizes potentially uncertain. For 5 trials, we did not obtain access to data necessary for calculating effect sizes. Furthermore, most trials had not been registered in clinical trial registries, so we could not rate RoB because of selective outcome reporting. Our search was broad, but we may have missed trials that addressed personality disorders in general but ultimately had a sample composed of patients with BPD. Owing to the small number of trials, we grouped therapies in broader categories, effacing subtler differences between orientations. Frequently cited approaches, such as schema-focused therapy, were underrepresented, mainly because they were mostly studied in head-to-head trials. The use of adjunct medication was neither standardized nor consistently reported and could have confounded psychotherapy effects.

Conclusions

Various independent psychotherapies demonstrated efficacy for borderline-relevant symptoms, self-harm, suicide, health service use, and general psychopathology in BPD. However, effects were small, inflated by publication bias, and particularly unstable for follow-up. These effects were no longer sustained in trials with low RoB. While treatment intensity per se did not seem to influence outcomes, there are indications that a control group balanced for the involvement of the study team in treatment or with a manualized protocol is as effective as psychotherapies tailored for BPD. We found no evidence that treatment retention would be higher for specific psychotherapies than for control interventions, contradicting systematic claims from individual trials. Future trials should implement prospective registration in clinical trial registries.

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REFERENCES

1. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Arlington, VA: American Psychiatric Association; 2013.

2. Oldham JM. Borderline personality disorder and suicidality. *Am J Psychiatry*. 2006;163(1):20-26.

3. American Psychiatric Association Practice Guidelines. Practice guideline for the treatment of patients with borderline personality disorder. *Am J Psychiatry*. 2001;158(10)(suppl):1-52.

4. Black DW, Blum N, Pfohl B, Hale N. Suicidal behavior in borderline personality disorder: prevalence, risk factors, prediction, and prevention. *J Pers Disord*. 2004;18(3):226-239.

5. Leichsenring F, Leibing E, Kruse J, New AS, Leweke F. Borderline personality disorder. *Lancet*. 2011;377(9759):74-84.

6. Gunderson JG. Borderline personality disorder: ontogeny of a diagnosis. *Am J Psychiatry*. 2009;166(5):530-539.

7. Zanarini MC, Frankenburg FR, Hennen J, Silk KR. Mental health service utilization by borderline personality disorder patients and Axis II comparison subjects followed prospectively for 6 years. *J Clin Psychiatry*. 2004;65(1):28-36.

8. Zanarini MC, Frankenburg FR, Khera GS, Bleichmar J. Treatment histories of borderline inpatients. *Compr Psychiatry*. 2001;42(2):144-150.

9. Ten Have M, Verheul R, Kaasenbrood A, et al. Prevalence rates of borderline personality disorder symptoms: a study based on the Netherlands Mental Health Survey and Incidence Study-2. *BMC Psychiatry*. 2016;16(1):249.

10. Skodol AE, Gunderson JG, McGlashan TH, et al. Functional impairment in patients with schizotypal, borderline, avoidant, or obsessive-compulsive personality disorder. *Am J Psychiatry*. 2002;159(2):276-283.

11. Skodol AE, Pagano ME, Bender DS, et al. Stability of functional impairment in patients with schizotypal, borderline, avoidant, or obsessive-compulsive personality disorder over two years. *Psychol Med*. 2005;35(3):443-451.

12. Linehan MM. *Cognitive-Behavioral Treatment of Borderline Personality Disorder*. New York, NY: Guilford Press; 1993.

13. Beck AT, Freeman A. *Cognitive Therapy of Personality Disorders*. New York, NY: Guilford Press; 1990.

14. Bateman A, Fonagy P. *Psychotherapy for Borderline Personality Disorder: Mentalisation Based Treatment*. Oxford, England: Oxford University Press; 2004.

15. Clarkin JF, Yeomans FE, Kernberg OE. *Psychotherapy for Borderline Personality*. New York, NY: John Wiley & Sons; 1999.

16. Bateman A, Fonagy P. Randomized controlled trial of outpatient mentalization-based treatment versus structured clinical management for borderline personality disorder. *Am J Psychiatry*. 2009;166(12):1355-1364.

17. Davidson K, Norrie J, Tyrer P, et al. The effectiveness of cognitive behavior therapy for borderline personality disorder: results from the Borderline Personality Disorder Study of Cognitive Therapy (BOSCOT) trial. *J Pers Disord*. 2006;20(5):450-465.

18. Doering S, Hörz S, Rentrop M, et al. Transference-focused psychotherapy v. treatment by community psychotherapists for borderline personality disorder: randomised controlled trial. *Br J Psychiatry*. 2010;196(5):389-395.

19. Linehan MM, Comtois KA, Murray AM, et al. Two-year randomized controlled trial and follow-up of dialectical behavior therapy vs therapy by experts for suicidal behaviors and borderline personality disorder. *Arch Gen Psychiatry*. 2006;63(7):757-766.

20. Clarkin JF, Levy KN, Lenzenweger MF, Kernberg OF. Evaluating three treatments for borderline personality disorder: a multiwave study. *Am J Psychiatry*. 2007;164(6):922-928.

21. Giesen-Bloo J, van Dyck R, Spinhoven P, et al. Outpatient psychotherapy for borderline personality disorder: randomized trial of schema-focused therapy vs transference-focused psychotherapy. *Arch Gen Psychiatry*. 2006;63(6):649-658.

22. Kliem S, Kröger C, Kosfelder J. Dialectical behavior therapy for borderline personality disorder: a meta-analysis using mixed-effects modeling. *J Consult Clin Psychol*. 2010;78(6):936-951.

23. Stoffers JM, Völlm BA, Rücker G, Timmer A, Huband N, Lieb K. Psychological therapies for people with borderline personality disorder. *Cochrane Database Syst Rev*. 2012;(8):CD005652.

24. Cox GR, Callahan P, Churchill R, et al. Psychological therapies versus antidepressant medication, alone and in combination for depression in children and adolescents. *Cochrane Database Syst Rev*. 2014;(11):CD008324.

25. Barth J, Munder T, Gerger H, et al. Comparative efficacy of seven psychotherapeutic interventions for patients with depression: a network meta-analysis. *PLoS Med*. 2013;10(5):e1001454. doi:10.1371/journal.pmed.1001454

26. Higgins JP, Altman DG, Gøtzsche PC, et al; Cochrane Bias Methods Group; Cochrane Statistical Methods Group. The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. *BMJ*. 2011;343:d5928.

27. Hedges LV, Olkin I. *Statistical Methods for Meta-Analysis*. Orlando, FL: Academic Press; 1985.

28. Borenstein M, Hedges LV, Higgins JPT, Rothstein HR. *Introduction to Meta-Analysis*. Chichester, England: Wiley; 2009.

29. Kraemer HC, Kupfer DJ. Size of treatment effects and their importance to clinical research and practice. *Biol Psychiatry*. 2006;59(11):990-996.

30. Ioannidis JP, Patsopoulos NA, Evangelou E. Uncertainty in heterogeneity estimates in meta-analyses. *BMJ*. 2007;335(7626):914-916.

31. Orsini N, Bottai M, Higgins J, Buchan I. Heterogi: Stata module to quantify heterogeneity in a meta-analysis. http://econpapers.repec.org/software/bocbocode/s449201.htm. Published 2006. Accessed November 27, 2013.

32. Duval S, Tweedie R. Trim and fill: a simple funnel-plot–based method of testing and adjusting for publication bias in meta-analysis. *Biometrics*. 2000;56(2):455-463.

33. Kamalabadi MJ, Ahmadi SA, Etemadi O, Fatehizadeh M, Bahrami F, Firoozabadi A. A study of the effect of couple dialectical behavioral therapy on symptoms and quality of marital relationships and mental health of Iranian borderline personality couples: a controlled trial. *Interdiscip J Contemp Res Bus*. 2012;3(9):1480-1487.

34. Linehan MM, Schmidt H III, Dimeff LA, Craft JC, Kanter J, Comtois KA. Dialectical behavior therapy for patients with borderline personality disorder and drug-dependence. *Am J Addict*. 1999;8(4):279-292.

35. Linehan MM, Dimeff LA, Reynolds SK, et al. Dialectical behavior therapy versus comprehensive validation therapy plus 12-step for the treatment of opioid dependent women meeting criteria for borderline personality disorder. *Drug Alcohol Depend*. 2002;67(1):13-26.

36. Munroe-Blum H, Marziali E. A controlled trial of short-term group treatment for borderline personality disorder. *J Pers Disord*. 1995;9(3):190-198. doi:10.1521/pedi.1995.9.3.190

37. Bateman A, Fonagy P. Effectiveness of partial hospitalization in the treatment of borderline personality disorder: a randomized controlled trial. *Am J Psychiatry*. 1999;156(10):1563-1569.

38. Linehan MM, Armstrong HE, Suarez A, Allmon D, Heard HL. Cognitive-behavioral treatment of chronically parasuicidal borderline patients. *Arch Gen Psychiatry*. 1991;48(12):1060-1064.

39. Verheul R, Van Den Bosch LM, Koeter MW, De Ridder MA, Stijnen T, Van Den Brink W. Dialectical behaviour therapy for women with borderline personality disorder: 12-month, randomised clinical trial in the Netherlands. *Br J Psychiatry*. 2003;182:135-140.

40. McMain SF, Links PS, Gnam WH, et al. A randomized trial of dialectical behavior therapy versus general psychiatric management for borderline personality disorder. *Am J Psychiatry*. 2009;166(12):1365-1374.

41. Bos EH, van Wel EB, Appelo MT, Verbraak MJ. A randomized controlled trial of a Dutch version of systems training for emotional predictability and problem solving for borderline personality disorder. *J Nerv Ment Dis*. 2010;198(4):299-304.

42. Koons CR, Robins CJ, Tweed JL, et al. Efficacy of dialectical behavior therapy in women veterans with borderline personality disorder. *Behav Ther*. 2001;32(2):371-390. doi:10.1016/S0005-7894(01)80009-5

43. Amianto F, Ferrero A, Pierò A, et al. Supervised team management, with or without structured

psychotherapy, in heavy users of a mental health service with borderline personality disorder: a two-year follow-up preliminary randomized study. *BMC Psychiatry*. 2011;11:181.

44. Blum N, St John D, Pfohl B, et al. Systems Training for Emotional Predictability and Problem Solving (STEPPS) for outpatients with borderline personality disorder: a randomized controlled trial and 1-year follow-up. *Am J Psychiatry*. 2008;165(4):468-478.

45. Carter GL, Willcox CH, Lewin TJ, Conrad AM, Bendit N. Hunter DBT project: randomized controlled trial of dialectical behaviour therapy in women with borderline personality disorder. *Aust N Z J Psychiatry*. 2010;44(2):162-173.

46. Cottraux J, Note ID, Boutitie F, et al. Cognitive therapy versus Rogerian supportive therapy in borderline personality disorder: two-year follow-up of a controlled pilot study. *Psychother Psychosom*. 2009;78(5):307-316.

47. Farrell JM, Shaw IA, Webber MA. A schema-focused approach to group psychotherapy for outpatients with borderline personality disorder: a randomized controlled trial. *J Behav Ther Exp Psychiatry*. 2009;40(2):317-328.

48. Gratz KL, Gunderson JG. Preliminary data on an acceptance-based emotion regulation group intervention for deliberate self-harm among women with borderline personality disorder. *Behav Ther*. 2006;37(1):25-35.

49. Gratz KL, Tull MT, Levy R. Randomized controlled trial and uncontrolled 9-month follow-up of an adjunctive emotion regulation group therapy for deliberate self-harm among women with borderline personality disorder. *Psychol Med*. 2014;44(10):2099-2112.

50. Gregory RJ, Chlebowski S, Kang D, et al. A controlled trial of psychodynamic psychotherapy for co-occurring borderline personality disorder and alcohol use disorder. *Psychotherapy (Chic)*. 2008;45(1):28-41.

51. Jørgensen CR, Freund C, Bøye R, Jordet H, Andersen D, Kjølbye M. Outcome of mentalization-based and supportive psychotherapy in patients with borderline personality disorder: a randomized trial. *Acta Psychiatr Scand*. 2013;127(4):305-317.

52. Kramer U, Kolly S, Berthoud L, et al. Effects of motive-oriented therapeutic relationship in a ten-session general psychiatric treatment of borderline personality disorder: a randomized controlled trial. *Psychother Psychosom*. 2014;83(3):176-186.

53. Leppänen V, Hakko H, Sintonen H, Lindeman S. Comparing effectiveness of treatments for borderline personality disorder in communal mental health care: the Oulu BPD Study. *Community Ment Health J*. 2016;52(2):216-227.

54. Pascual JC, Palomares N, Ibáñez Á, et al. Efficacy of cognitive rehabilitation on psychosocial functioning in borderline personality disorder: a randomized controlled trial. *BMC Psychiatry*. 2015;15:255.

55. Priebe S, Bhatti N, Barnicot K, et al. Effectiveness and cost-effectiveness of dialectical behaviour therapy for self-harming patients with personality disorder: a pragmatic randomised controlled trial. *Psychother Psychosom*. 2012;81(6):356-365.

56. Reneses B, Galián M, Serrano R, et al. A new time limited psychotherapy for BPD: preliminary results of a randomized and controlled trial. *Actas Esp Psiquiatr*. 2013;41(3):139-148.

57. Soler J, Pascual JC, Tiana T, et al. Dialectical behaviour therapy skills training compared to standard group therapy in borderline personality disorder: a 3-month randomised controlled clinical trial. *Behav Res Ther*. 2009;47(5):353-358.

58. Turner RM. Naturalistic evaluation of dialectical behavior therapy–oriented treatment for borderline personality disorder. *Cogn Behav Pract*. 2000;7(4):413-419.

59. Weinberg I, Gunderson JG, Hennen J, Cutter CJ Jr. Manual assisted cognitive treatment for deliberate self-harm in borderline personality disorder patients. *J Pers Disord*. 2006;20(5):482-492.

60. Barnicot K, Katsakou C, Marougka S, Priebe S. Treatment completion in psychotherapy for borderline personality disorder: a systematic review and meta-analysis. *Acta Psychiatr Scand*. 2011;123(5):327-338.

61. Higgins JPT, Green S, eds. *Cochrane Handbook for Systematic Reviews of Interventions*. Version 5.1.0. http://training.cochrane.org/handbook. Updated March 2011. Accessed November 2016.